**Problem of the Week #8 Q4**

Due 5/11/12 by 3:15 PM

Turn in to the Math Office, hand in to Matt Mistele, or email to 13mmistele@ransomeverglades.org

* **Number of possible Verbal Arithmetic puzzles that begin with RANSOM + LOVES and end with a legitimate English word, using exactly 10 letters: 752**
* **Number of these puzzles with a unique solution: 103**
* **Number of these puzzles that happen to honor a retiring Ransom teacher: 1** ☺

***The 40-Year Equation Challenge***

RANSOM

+LOVES

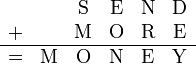
LESTER

(Hint: E = 3 and O = 0)

*(Instructions and tips for solving verbal arithmetic problems the back. Happy puzzling!)*

Solving Verbal Arithmetic Puzzles

From Wikipedia, the free encyclopedia

**Verbal arithmetic**, also known as **alphametics**, **cryptarithmetic**, **crypt-arithmetic**, **cryptarithm** or **word addition**, is a type of [mathematical game](http://en.wikipedia.org/wiki/Mathematical_game) consisting of a mathematical [equation](http://en.wikipedia.org/wiki/Equation) among unknown [numbers](http://en.wikipedia.org/wiki/Number), whose [digits](http://en.wikipedia.org/wiki/Numerical_digit) are represented by [letters](http://en.wikipedia.org/wiki/Letter_(alphabet)).

* The goal is to identify the value of each letter.

The solution to this puzzle is O = 0, M = 1, Y = 2, E = 5, N = 6, D = 7, R = 8, and S = 9.

* Each letter represents a different digit, and the leading digit of a multi-digit number must not be zero.

A good puzzle should have a unique solution, and the letters should make up a cute phrase (as in the example above).

Solving a cryptarithm by hand usually involves a mix of deductions and exhaustive tests of possibilities. For instance, the following sequence of deductions solves the first couple letters of the SEND + MORE = MONEY puzzle above (columns are numbered from right to left):

1. From column 5, **M = 1** since it is the only carry-over possible from the sum of two single digit numbers in column 4.
2. To produce a carry from column 4 to column 5, S + M is at least 9, so S is 8 or 9, so S + M is 9 or 10, and so O is 0 or 1. But M = 1, so **O = 0**.
3. If there were a carry from column 3 to column 4 then E = 9 and so N = 0. But O = 0, so there is no carry, and **S = 9**.
4. Etc…